

The experience on the implementation of LIFE MONTSERRAT

Integrated silvopastoral management plan: An innovative tool to preserve biodiversity and prevent wildfires

Outline

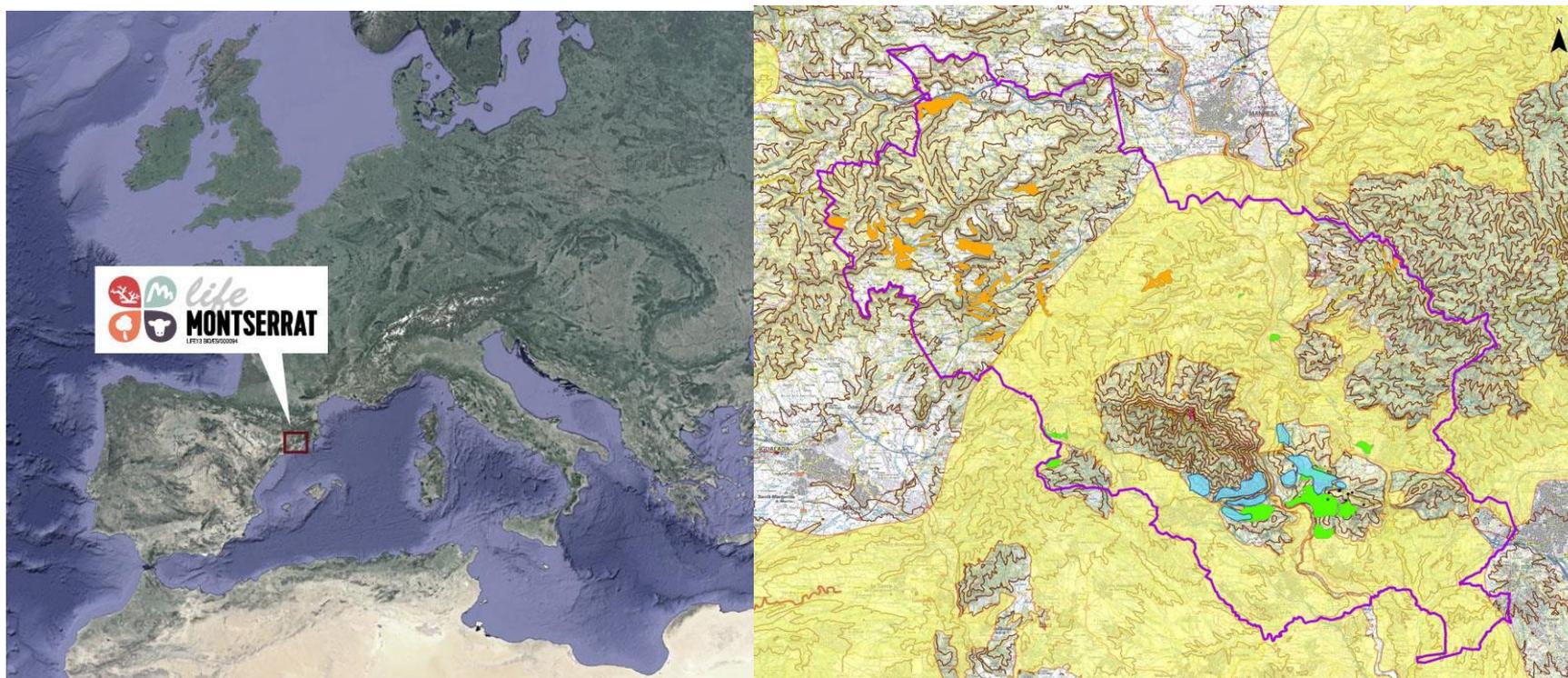
1. Location & Highlights
2. Ecological History & Biodiversity problem
3. The Project: Objectives, Actions & Expected results
4. Methodology & Development of the Project
5. Results
6. Concluding remarks

1. Location & Highlights

LIFE Montserrat project is carried out in Catalonia. The project area is located in Montserrat Mountain and its surroundings (30 km from Barcelona).

3,56 M €

Management of **2,782 ha** from a targeted area of **42,487 ha**



1. Highlights of Montserrat area

2 Natural parks.

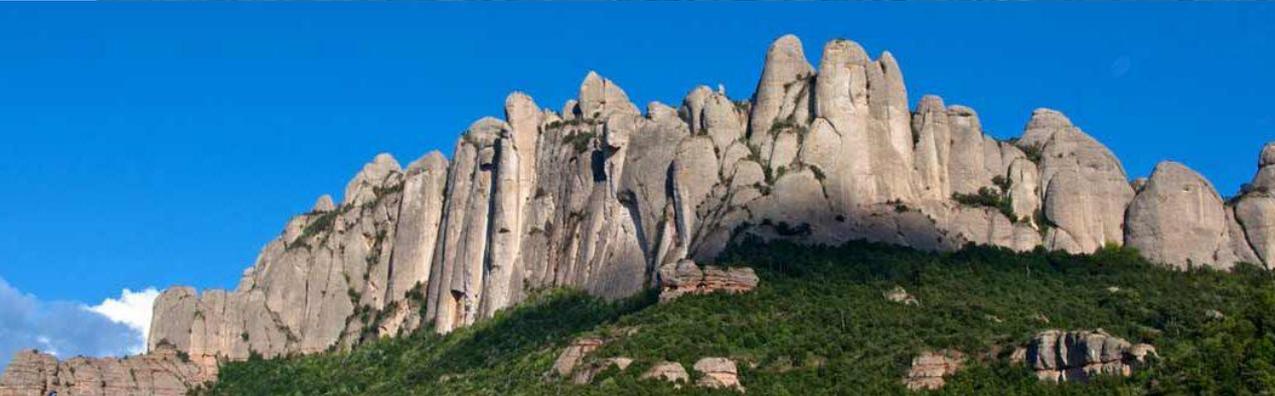
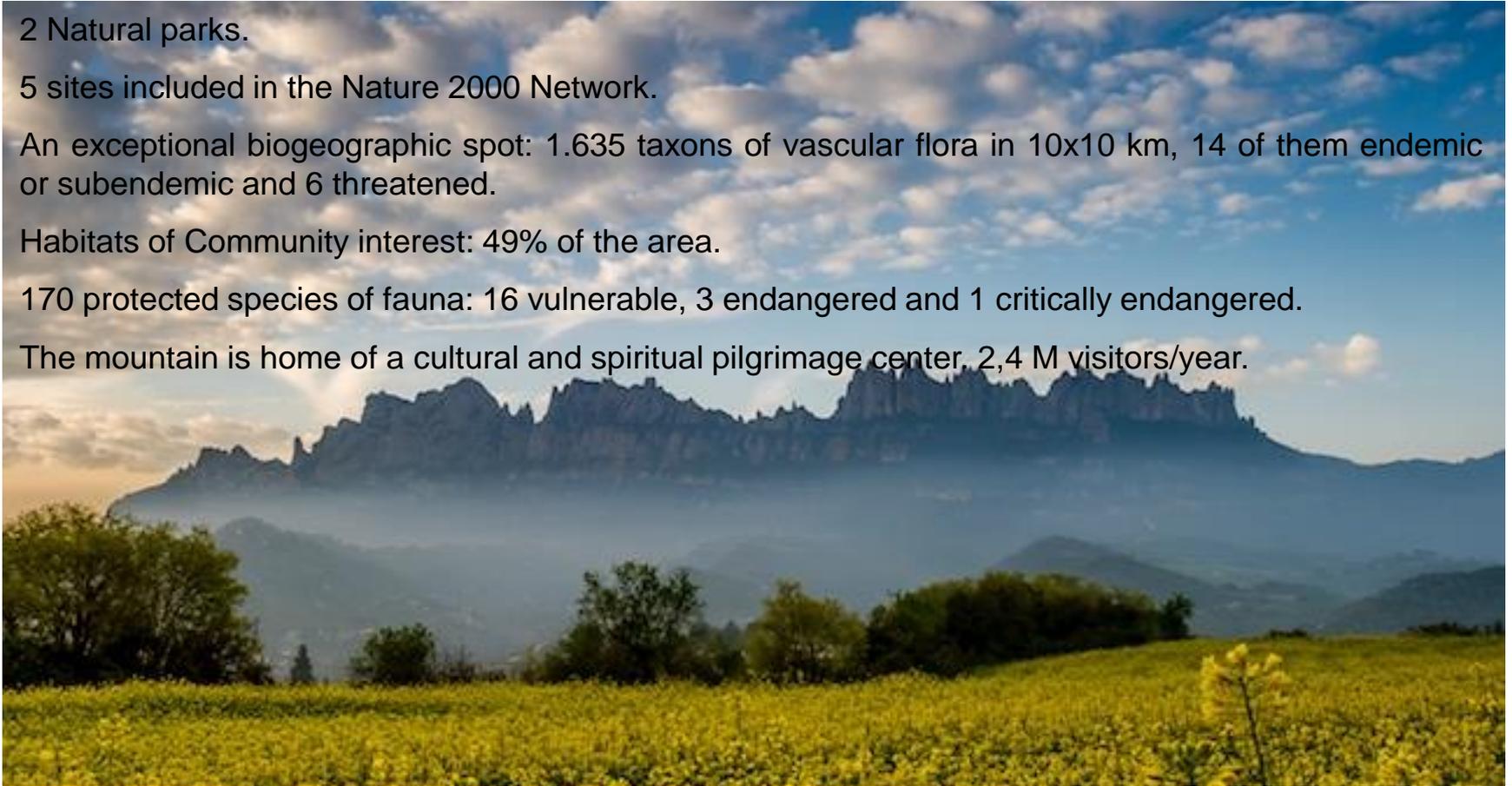
5 sites included in the Nature 2000 Network.

An exceptional biogeographic spot: 1.635 taxons of vascular flora in 10x10 km, 14 of them endemic or subendemic and 6 threatened.

Habitats of Community interest: 49% of the area.

170 protected species of fauna: 16 vulnerable, 3 endangered and 1 critically endangered.

The mountain is home of a cultural and spiritual pilgrimage center, 2,4 M visitors/year.



2. Why a LIFE? Ecological History and Past Land-use



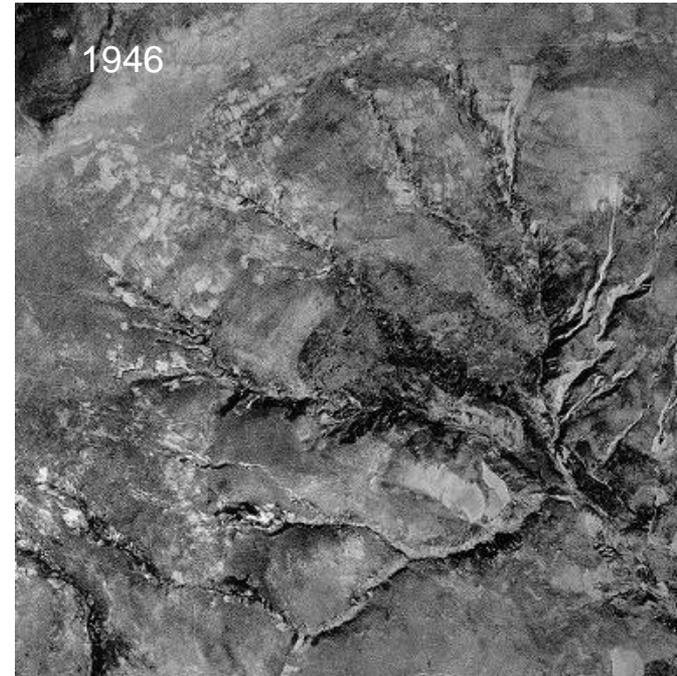
Increase of population in XIX & XX centuries produces exhaustion of natural resources and soil loss by erosion. Afforestation plans (1940 to 1984) and grazing banned.



Agrarian revolution and rural abandonment. Between 1990 and 2015, in Spain, the extensive cattle census has decreased by 47% (Ruiz et al., 2015). No management and communities lignification.



Loss on open habitats and mosaic landscapes. Expansion of homogeneous fire-prone vegetation. High vulnerability to perturbations (pests, fires) and loss of biodiversity.



1946



2016

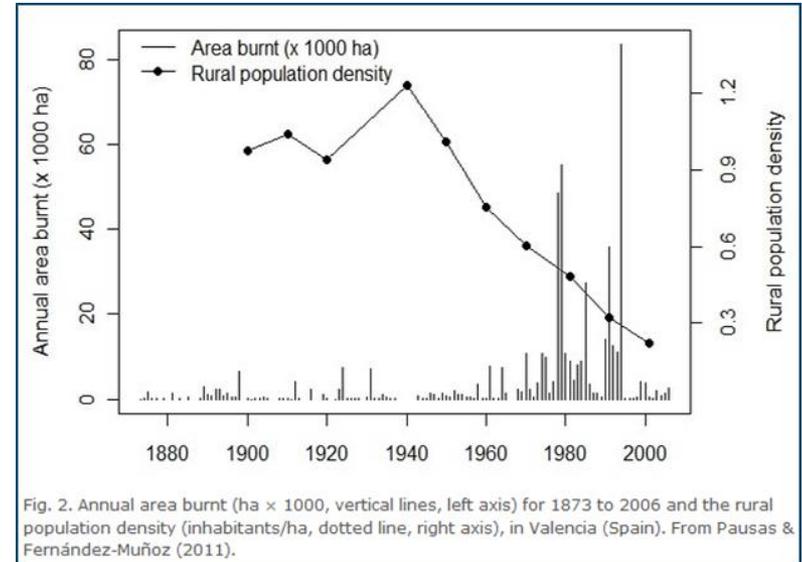
2. Wildfires and complexity

High vulnerability of the forests:

The major forest fires in the Mediterranean area have increased in the last decades. The targeted area has suffered major recurrent wildfires (1973, 1978, 1979, 1980, 1982, 1986, 1994, 2015).

Global change: abandonment of large territories managed in the past with extensive livestock and familiar agriculture, that helped to maintain a diverse, fine-grained landscape.

Landscape homogenization with continuous fuel loads leads to extreme fire behaviour. Promote the resiliency of forests is a major issue in the Climate change scenario.



2. Biodiversity problem targeted

Regression of high interest habitats and species:

The land use changes, the forestation and the recurrent fires have led to the homogenization of the landscape with simplified and vulnerable habitats (immature forests without open spaces).

The area included in the project is predominantly forest (64%) and occupies an area of 42.487 ha.

A 49% of the total targeted area (this is 20.748 ha) covers habitats of Community interest. Of these hectares, a 3,12% (1.324 ha) are priority habitats.

But many species are in decline or local extinction, because many ecosystems and species listed in the Habitats and Birds Directives are supported by traditionally grazed areas.

Impacts resulting from fragmentation include changes in species composition, community structure, population dynamics, breeding success and a range of ecosystem processes.

Low-intensity livestock farming is the most important agricultural practice for the maintenance of species and High Natural Value Habitats (Baldock et al. 1993).

The loss of pastoral activity is already considered a threat to the objectives of the Natura 2000 Network (Olmeda et al. 2013).



3. Objectives of the project:



- 1. The development of ecosystem-based measures to increase resilience and stability of forests against fires** by creating and/or maintaining strategic areas that will prevent the spread, facilitate the extinction and decrease the intensity and extension of wildfires. Forest stratification and extensive pasture.
- 2. The contribution to biodiversity conservation and improvement in the area**, through open habitats recovery by pastoralism. Conservation of 20 fauna species of special conservation concern and improvement of the habitat of over 140 species protected by the international or national legislation
- 3. Increase connectivity through the creation of a mosaic of scrub, natural grasslands, fields and forests** that will link two Natura 2000 sites.



A. Preparatory actions

Creation of the Association of livestock farmers of Montserrat

Forest inventory

Determination of grazing patterns and regimes

C. Concrete conservation actions

1 Recovery of open habitats:

1.1 Mowing scrubs (144 ha)

1.2 Prescribed burnings (145 ha)

1.3 Recovery of abandoned fields (289 ha)

2 Forest stratification and preparation for pasture (1.295 ha)

3 Implementation of the grazing system (2.783 ha)

D. Monitoring of the impact of the project actions

E. Public awareness and dissemination of results

3. Previous situation



3. Expected results

- Structuration and regeneration of forests, promoting stability
- Reduction of the fuel volume in strategic areas by grazing
- Minimize risk of forest fires by maintaining a mosaic type landscape
- Reduction of wildfires recurrence from 70-100 to 250-500 years
- Reduction of the costs of fire extinction
- Increasing stakeholder awareness and involvement
- Ensuring economic-based sustainability of Natura 2000 network sites
- Recovery of abandoned agrarian and open habitats
- Increasing the survival rate and breeding success of threatened species
- Conservation and improvement of landscape quality
- Preserving and enhancing the functionality of the ecosystems as connectors (diminishing fragmentation, enhancing permeability and migration)

3. Expected results



4. Methodology & Development of the Project

Current conditions of landscape



Young forest with densities higher than 50.000 trees per hectare.



Biomass is structured in a continuum from the ground up to 3-7 meters tall.



Forest structuration.



Burned young forests (2015).

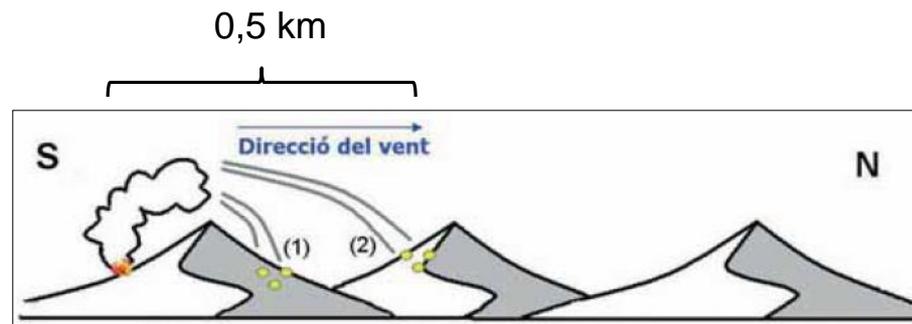
4. Conventional wildfire management strategy



The conventional management of forest fires in EU is often more reactive (based in extinction) than preventive (land management).

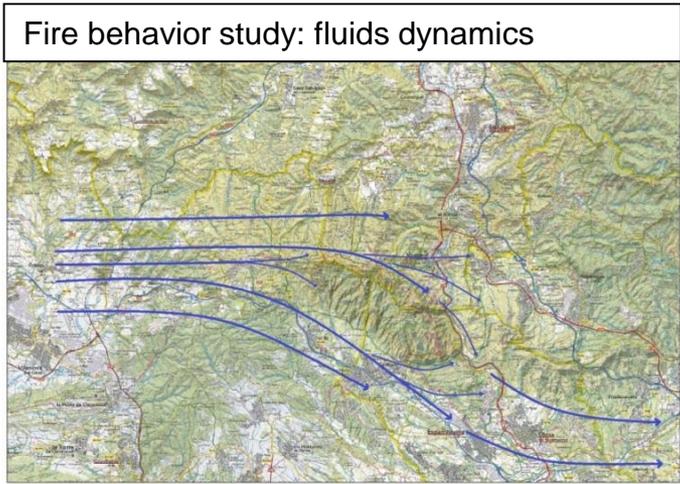


The model is of fuelbreaks and extinction protocols are proven to be expensive and inefficient.

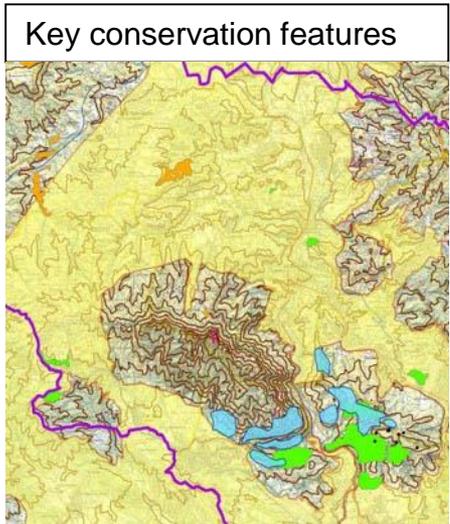
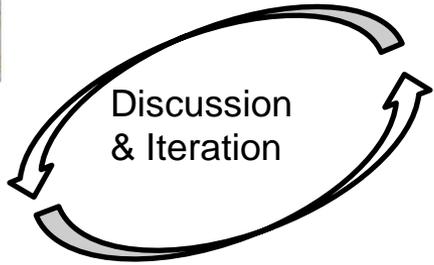
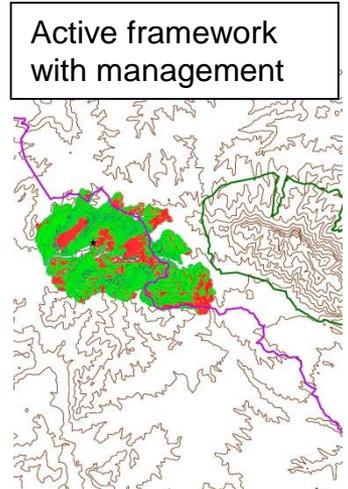
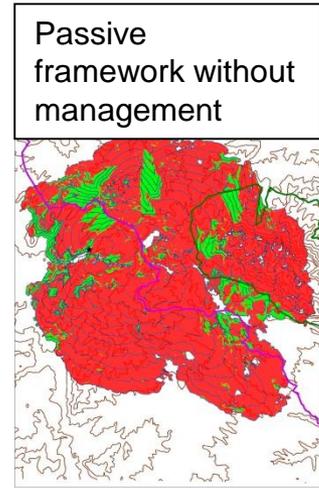


Behavior of a extreme fire (Firemen of Catalonia, 2011).

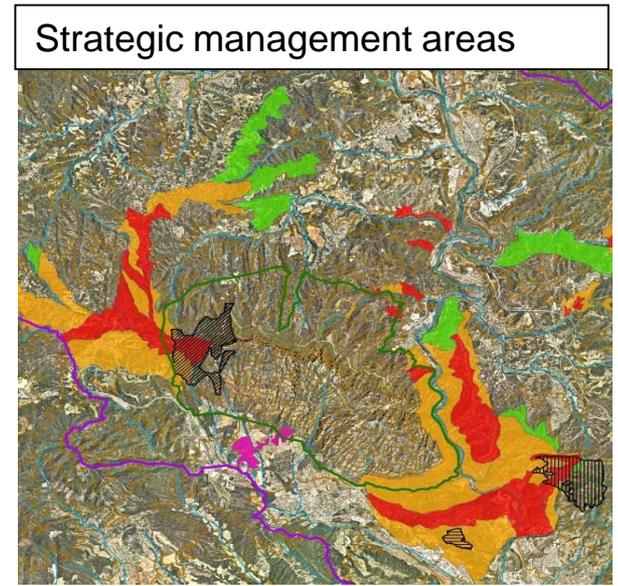
4. ISMP methodology: planning protocol



Modeling



+





Young forest with densities higher than 50.000 trees per hectare.



Biomass is structured in a continuum from the ground up to 7 meters tall.

Paisatge actual
Matollar dens i bosc de pi blanc



- Bosc immadur sense gestió** >>> **Bosc de baixa qualitat**
- Paisatge homogeni** >>> **Poca diversitat d'hàbitats i espècies**
- Càrrega de combustible elevada** >>> **Molt vulnerable als incendis**

Paisatge objectiu
Mosaic de pastures, matollars i boscos



- Espais oberts** >>> **Afavoreix espècies d'especial interès per a la conservació i hàbitats prioritaris**
- Paisatge divers** >>> **Potencia la biodiversitat**
- Menys biomassa combustible** >>> **Contribueix a la contenció del risc de grans incendis forestals**



Forest structuration.



Grazing reintroduction.



4. Innovative issues: New approaches to the preservation of ecosystem functions through environmental services

The project focuses on fire **prevention** (versus extinction) by:

Active management of the **whole forest area** (versus creating firebreaks or other infrastructure), **imitating natural processes** (silvopastoralism) and improving the resilience of the ecosystem (landscape scale).

The **integration of human systems** at the *in situ* ecosystem processes (versus support from public budgets *ex situ*).

The peculiarity of the method is the **public-private partnership** involving **local actors**, **transversal policies** and **cross-institutional coordination** on forest management, pastoral system implementation, fire prevention and forest conservation.

Acting on **private property** such as **land stewardship** initiative, through agreements and alliances to shared needs and goals.

It pursues the **sustainability of the project** after LIFE+ funding, based on the local socioeconomic infrastructure and networks: **viability of low-intensity farms**.

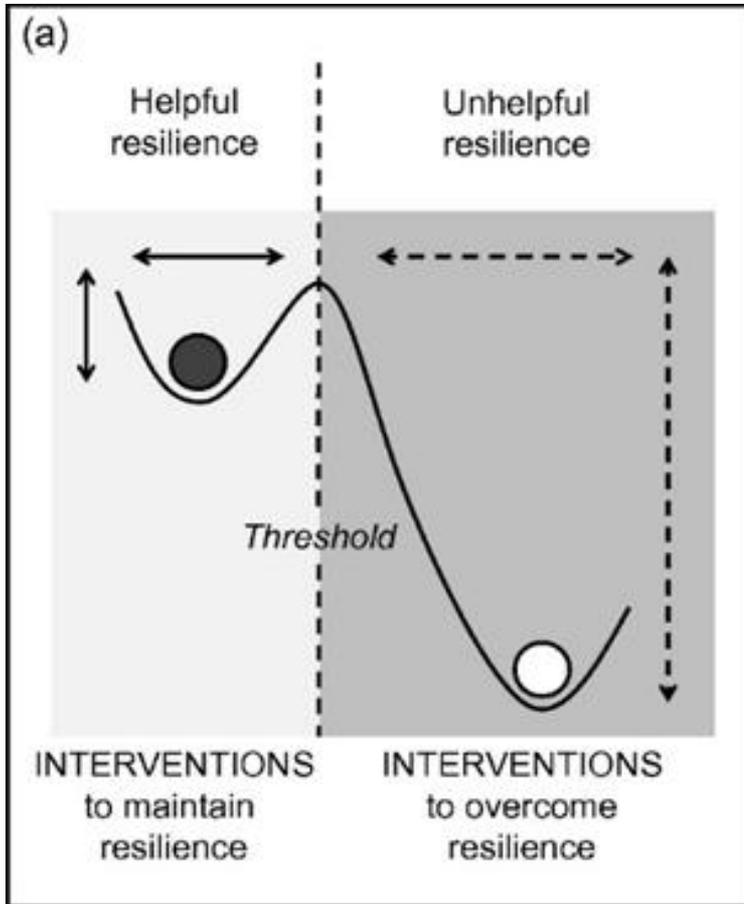
Pasture as a active tool for conservation of nature: farmers are major players, contribute to decision making and their activity is a management tool.

Participation and direct involvement of **shepherds as a conservation actor**. Creation of an association of shepherds and **empower local institutions**.

Explore additional funding by incorporating externalities (**environmental services**) to the local economy.



4. How to change the ecosystem state by grazing?



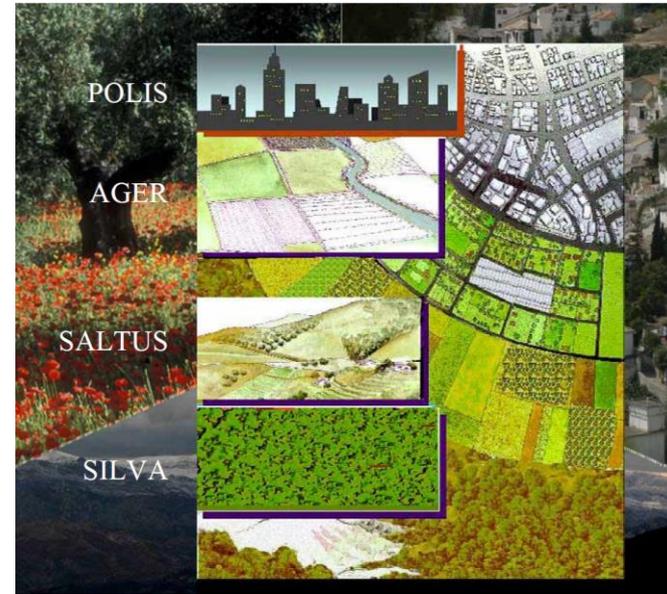
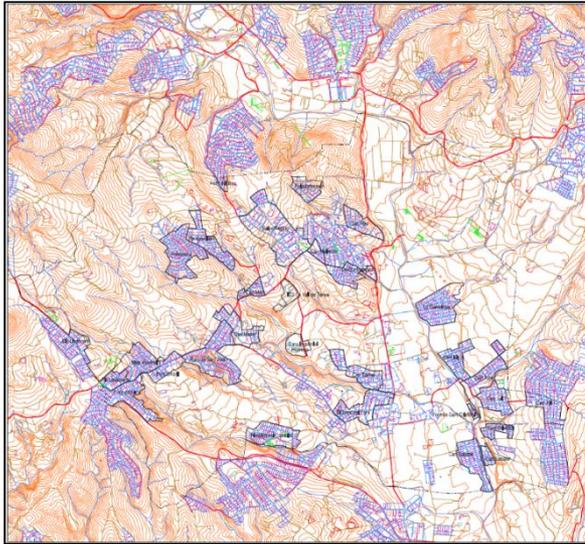
Standish (2014)

Spectrum of **ecosystem states**, their likely responses to disturbance (i.e., decline or recovery), and the corresponding options for their **management** (Suding and Hobbs, 2009).

The **resilience** of states to disturbance is proportional to the width and depth of the cups.

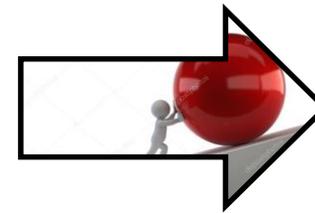
Theoretical expectations of how disturbance can **force a change** between two states of the ecosystem (represented by balls). Degraded state (ball filled with white: rural desertion) and not degraded (ball filled with black: low intensity farming).

4. Sustainability of fundraising: the integration of the urban input



Interaction between primary (agricultural and forest) and tertiary sectors (urban administrations), as the 3 necessary pillars for the sustainability of the system and the multifunctional character. Interaction between the taxes hotspot and the biodiversity hotspot.

Exchange of matter, energy and ecosystem functions between the urban, agrarian and natural systems.



4. Socioecological Systems (SES) and Governance

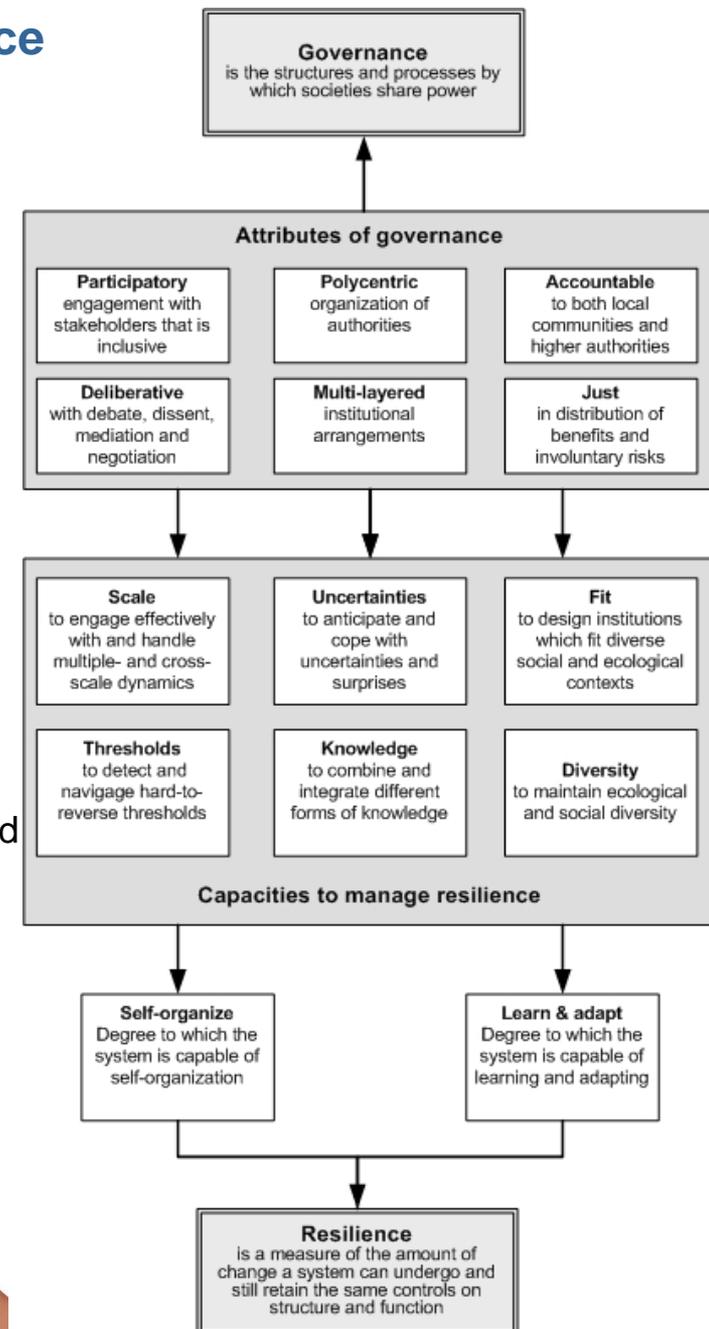
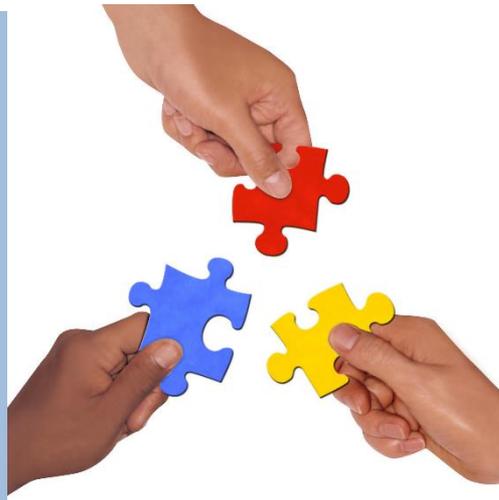
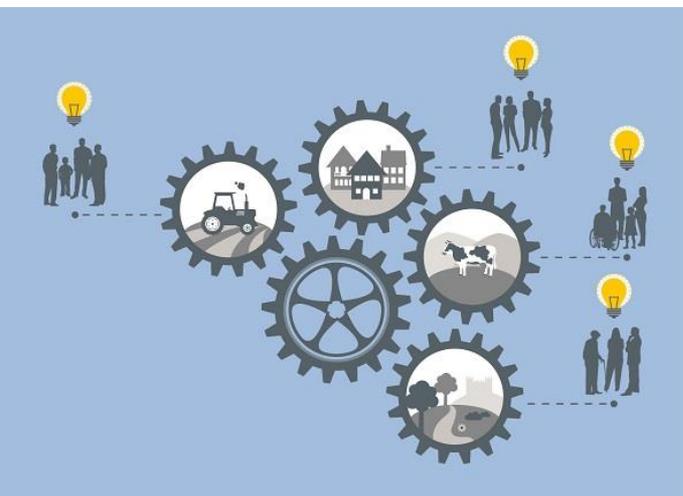
The ecological and social systems are closely linked to each other (Berkes and Folke, 1998): SES.

Governance is the structures and processes by which people in societies make decisions and share power (Lebel et al., 2005).

Significant aspects for **adaptive governance** of complex SES (Boyle et al., 2001):

1. Ongoing **monitoring and reassessment** to improve adaptive responses.
2. Support **flexible institutions** and **multi-level governance** systems: adaptive co-management, dynamic learning, multilevel linkage. That is, neither centralization nor decentralization, but interactions between levels.
3. Deal with external disturbances, uncertainty and surprise.

Resilience in SES resides in the capacity for **self-organization** and **Learn & adapt**.





4. The revitalization of the extensive livestock sector under the Life Montserrat project

Approach

Vegetation management is ensured by a dual activity:
Economic and Environmental Services Provision

To this end, it is necessary to ensure that herds and shepherds can develop an economically viable and therefore profitable business. This ensures the long-term viability of the project, happy people, and thus prevent future conflicts. Therefore, the vitality of the livestock projects that will be installed is a priority objective.

4. Diagnosis of visits / interviews

- Between 2014 and 2015, closure of 17% of farms
- Unorganized sector
- 12 breeders registered in the area, but only 5 are potential participants (= 3 cattle + 2 goats)
- 33% are professionals; 25% to start (young people); 17% of precariousness; 17% in the professionalization process
- 58% over 50 years old
- Some non-legalized installations
- Administrative obstacles (Municipalities)
- Lack of training
- **Unstructured** primary sector: no auto-organization.
- Need to **introduce new** shepherds and farmers
- The objectives of the program depend on the **viability of these projects**
- It needs to be restructured and **revitalized** (not to prolong the problems of rural and forest abandonment)
- **Collaboration** needed within the School of Shepherds of Catalonia & Governments.



4. Shepherds & Farmers Support

1. Creation of a shepherd association
2. Farm projects assistance
3. First capitalization support. Buy up to 50% of the livestock.
4. Basic infrastructure installation: fences & water points.
5. Access to water guaranteed
6. Improvement of buildings for livestock (hangars)
7. Relocation of grazing lands
8. Individualized advice (bureaucracy, management, health...).
9. Access to land contracts: pastures (from forest owners) and fodder crops (diet supplement).
10. Promotion of Environmental Service contracts (municipalities, Department of Agriculture).



4. Co-governance process

Social awareness: assistance to municipal technicians, coordination between administrations: less bureaucracy & legal difficulties.

Eligibility Improvements (Common Agricultural Policy, CAP) in coordination with the Agriculture Administration (regional & state): improvement of basic payments.

Promotion of the application of agri-environmental measures (CAP) in the regional administration: complementary payments (inked at grazing in strategic areas).

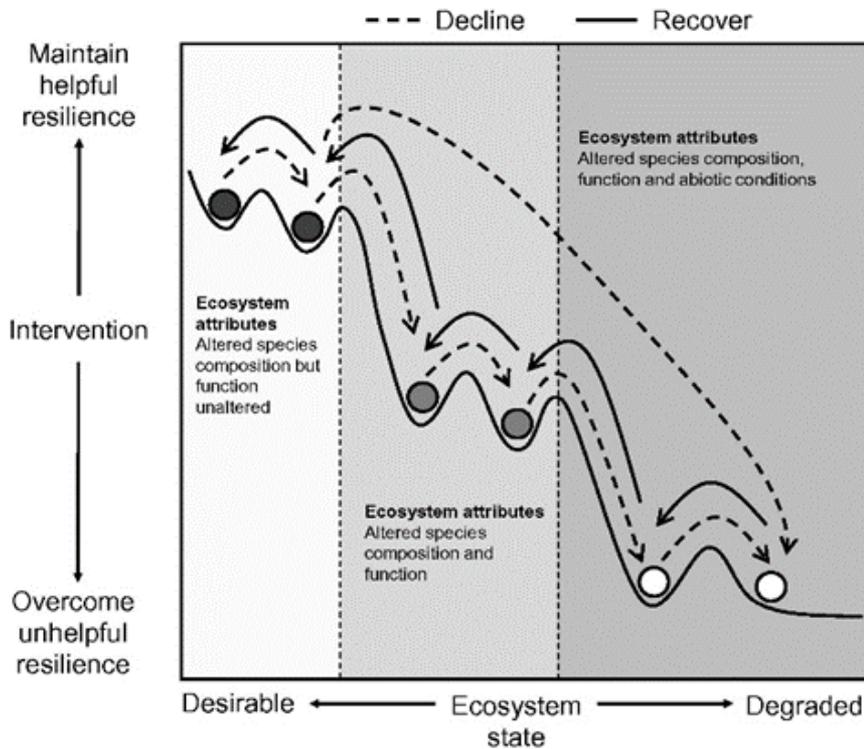
Promotion of joint management of the forest area and fuelbreaks in urban areas (municipal and regional cooperation): complementary payments.



5. Results



Good results of forced grazing as a tool for opening habitats.
 Increase of biodiversity indicators in grazed areas. But long-term experiences are required.
 Lower surface set in pasture than expected.



6. Concluding remarks

Difficulties

A threatened pastoral society: need specific state support policies to carry to auto-organization.

Lack of knowledge of the pastoral world in the entire industrial society: need for the dissemination of the goods it provides and its needs.

Vertical structures of decision making: need to evolve to horizontal or heterarchic.

Lack of transversality: a new bureaucratic culture to be built.

Management decisions was based in personal experience and common sense: need to incorporate scientific and local knowledge.

Paying cattle is an inappropriate action since it can be linked to private interests and partially decoupled from agricultural production.

A few corrupt individuals linked to ancient power structures can obstruct technical objectives: is every need a leadership and independent technical direction, and separation of powers.

Delights

The involvement of many actors and institutions for innovation: encourages a new management.

Positive response of shepherd and farmer sectors.

High wealth in human relationships: the rural society multiplies the investment in time and financing thanks to a great human potential for entrepreneurship and collaborative networks.

Good global citizen perception.

He has created a hopeful vision in technicians to apply transversality.

The shepherd sector has been known to technicians and politicians of the partners and other organizations: a greater awareness of the attributes of the sector will help make it viable.



6. Concluding remarks

Cooperative project for the integrated and sustainable management of the Mediterranean mountain.

A set of circumstances linked to long-term projects questioned some approaches (i.e. wildfire in 2015, changes in collaborating landowners, changes in the team).

Delays due to the complexity of the project: with more complexity of the system, smaller and delimited projects are recommended.

Shared vision of the agrarian, forestry, landowners, environment, risk management and biological conservation organizations and administrations. It has allowed us to spread a integrated vision of management.

The project contributes to social spread of Low-intensity livestock farming.

Monitoring indicators confirm successful results in habitats, although changes in conservation require long term experiences. A greatest scientific support can be suitable in Life projects.

We can give deficient co-management and alliances with farmers due to ancient decision-making structures.

When managed habitats include humans as a key specie, we are obliged to plan the projects in the framework of socioecological systems (SES).

When working with SES it is essential to include Governance in nature or biodiversity projects: the social part can be more important than the technical one for success.



Thank you for your attention

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